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AUTHOR Swartz, Carl
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ABSTRACT

Toxic chemicals, noise, inadequate lighting, poor equipment design, smoking, and accidents pose serious health hazards for millions of office workers. Stress and boredom also contribute to the problems of safety. Workers should be on guard in the office for hazards, many of which are recognizable through common sense and patience. Workers must take time to relax during the day. They also need to realize that machines must be certified as safe, that the working environment must fit the worker--not vice versa--and that a great deal of stress can be eliminated by a change in working habits. Office workers should take initiatives to become aware of office safety and develop a plan of safety for their offices. (This monograph focuses on environmental hazards in offices, such as exposure to dangerous chemicals from copiers, duplicating machines, and glues; eye problems from using computer terminals; and allergies from cigarette smoke. It suggests ways that workers can reduce such hazards.) (KC)

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OFFICE SAFETY (Part II)

PREPARED BY: Carl Swartz
Associate Professor
Business Administration

BUREAU OF VOCATIONAL SERVICES
DIVISION OF VOCATIONAL & ADULT EDUCATION
STATE DEPARTMENT OF EDUCATION
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INTRODUCTION

This is the second instructional unit dealing with office safety. This unit will discuss the following areas:

1. Causes of Allergies and Asthmatic Reactions
2. Toxic and Noxious Chemicals and Fumes
3. Illumination and Glare
4. Noise
5. The Dangers of VDT's
6. Smoking Hazards
7. Conclusions

This monograph has been prepared as a means to warn students who will enter business and office positions of the impending dangers they may encounter. The content should be presented in two ways: First, the contents of the earlier monograph, "The Million Dollar Bowl: OSHA in the Office" and the contents of this monograph, "Office Safety, Part II" should be disseminated and discussed. Second, the student should participate in the game accompanying this paper for reinforcement purposes. Levity has been incorporated into the game but leads to realistic application and learning.

Please feel free to duplicate all or part of these monographs or the game.

PART I

"WHAT'S THE REASON THAT YOU'RE SNEEZIN?"

Allergies and Asthma

Allergies, hay fever, asthma and related problems due to on-the-job irritants have made life pretty miserable for up to thirty-five million allergic Americans. Allergies are among this country's most common health problems. In fact, about one in six Americans suffers from at least one allergy. What does this mean to sufferers who work in an office? Working in an office can cause severe hardships if one is allergic to the chemicals used in duplicating machines, correction fluids, rubber cement and some "cleaners." Benzene, Toluene and Ozone from copying machines may generate smells that can lead to irritation of the eyes, nose, and throat and in long exposures lead to lung disease. Perfumes worn by co-workers or cigarette smoking mixed with fumes can aggravate asthmatic and allergic conditions. Dust allergies, the most common of all allergies, can be aggravated by the way an office is decorated; thick carpeting, heavy draperies and upholstered furniture tend to trap a great deal of dust. People who are allergic to dust can contact an allergy called Allergic Rhinitis. This disorder can result in hearing problems due to blocked sinus drainage, sore throat, violent sneezing, itchy nose and other symptoms associated with hay fever.

Many people are allergic to substances and break out in hives, or are prone to swollen local reactions or suffer from eczema as a result of exposure. Causes of such reactions are inks, duplicating fluids, and some room sterilizers.

Still another form of allergy is Asthma. Asthma is a disease characterized by the narrowing of the bronchial tubes accompanied by wheezing and shortness of breath. Studies indicate that asthma disorders are heightened by cigarette smoking, chemicals and/or dust. Job stress has been proven to be a cause of Asthma attacks.

If you suffer from any of the symptoms mentioned in this report, select the work environment in which you will spend 35 hours each week very carefully. Check to see if there are: FUMES from neighboring production departments, large amounts of dust present, if other irritants from adjacent manufacturing and/or printing processes are present and if cigarette smoking is allowed in the office. Think twice before agreeing to work in that particular office.

PART II

"MY EYES ARE BURNING, MY STOMACH'S CHURNING
AND I CAN'T SEEM TO FIND THE FLOOR"

Toxic Chemicals

Case A: Anita Reber worked three feet from a copying machine for a year and a half. Before long she became ill, suffering from rhinitis, headache, skin irritations, and continuous coughing. She lost both her sense of taste and her sense of smell. When she told company officials that she thought it had to do with the copying machine, they tried to fire her. Anita eventually did lose her job and she suffers permanent lung damage. But after the intervention of NIOSH, she won Workers' Compensation and the company is responsible now for her on-going medical treatment.

Ozone as previously mentioned comes from certain types of copiers. Exposure to low concentration of ozone should be avoided because it (ozone) depresses the nervous system and produces drowsiness. Prolonged exposure to ozone in an immediate work area without ventilation can cause permanent lung damage. Photocopying machines, electrostencil machines, and electric typewriters emit ozone. One study found that in a poorly ventilated area, a health risk could occur when 83 photocopies were made over a two-hour period. Proper machine cleaning and maintenance reduces risks, but further study is still being done to evaluate the dangers of ozone.

Methanol or Methyl Alcohol found in spirit duplicating fluids and various inks and cements can cause headaches, giddiness, insomnia and blurred vision as well as skin irritations, so watch out!

Formaldehyde used in insulation materials and furniture sealant has been found to pose a potential cancer risk to humans.

Other potentially harmful chemicals contained in commonly used office supplies include: nitropyrene, a suspected carcinogen (cancer-producing agent) found in some photocopying toners; trinitrofluorenare (TNF), also found as a suspected cancer-producing chemical, found in large I.B.M. printers and copiers; trichloroethylene (TCE) suspected carcinogen found in liquid eraser products; benzene, a carcinogen, and toluene, a powerful narcotic, found as impurities in cleaning solvents. At moderate levels of exposure to organic solvents workers complain of eye irritation, changes in skin color, and heart palpitations. Several deaths have been connected to the sniffing of a typewriter correction fluid.

PART III

"HAS WHAT YOU'VE SEEN, GIVEN YOU WHAT YOU'VE GOT?"

Illumination and Glare

Case B: Penny worked for seven months for a large bank as a word processor. During that time her workload was so heavy that she worked long overtime hours, frequently missing lunch and working into the evening. Due to poor lighting and continuous work on the word processor, Penny's eyesight deteriorated and she suffered chronic back and neck strain. During this same period she trained a man on the job. Even while the man was in training he earned $75 per week more than Penny. Her 60-hour work weeks, plus her inability to get ahead of her workload and the lack of interest from her boss caused Penny to develop insomnia from the stress. When Penny finally quit, it took four people to replace her. She earned $259 per week.

Eye strain can be caused by four factors: the time of day, the size of the items dealt with, the contrast between light and dark and the brightness or glare of visibility. The unit to measure light falling on a task is called a footcandle. In one study, a young age group could perform at 70 units of light or footcandles, a 36 to 45 year old group needed 100 footcandles and those in the 56 to 65 category needed twice that to perform equally well.

Poor lighting can cause eye strain which can increase the frequency of fatigue, mood alterations, headaches and other physical discomforts. When the eyes have to focus at close range due to poor lighting, the ciliary muscles (their function is to change the shape of the lens of the eye to bring the objects being viewed into focus) must compress the lenses of the eye. Viewing at close range for long periods is very tiring to these muscles and causes headaches, fatigue and eye strain.

Glare is also a significant cause of eye strain. Glare can be produced by direct light from windows, from shiny work surfaces, keyboards, and lighting that is too bright or incorrectly positioned in relation to work. This reflected light makes it difficult for a typist to see the characters on a page of copy. Glare may also be a cause of neck and back pains as the typist or clerical person has to contort his/her body in an effort to minimize glare. Various measures can be taken to prevent glare that is caused by direct light being reflected on a page: Install blinds or shades on nearby windows, relocate machines, install indirect lighting, reduce general lighting to make copy clear and/or install dimmer switches on overhead lighting so that personnel can adjust lighting to the most comfortable levels of brightness.

PART IV

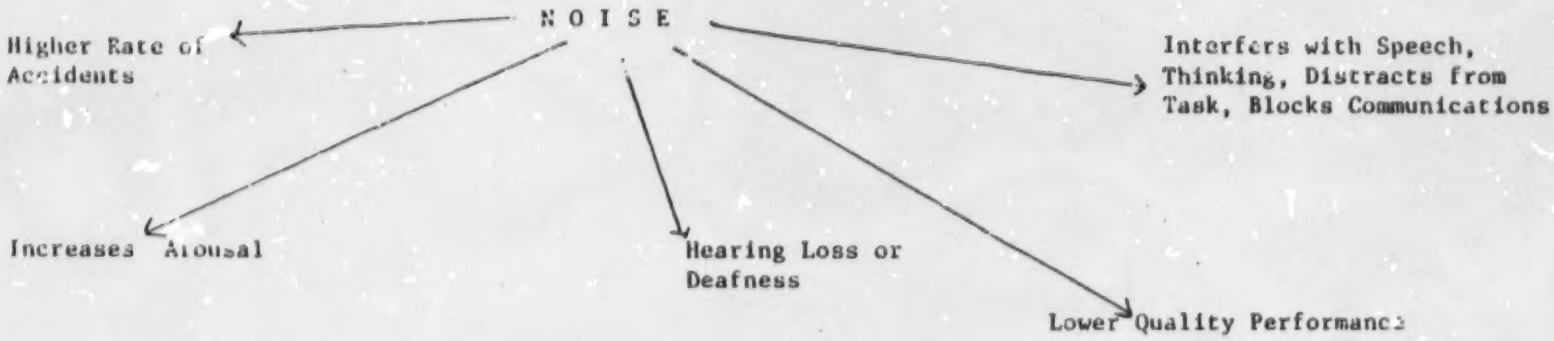
"SAY WHAT?"

Noise

Noise is defined in this paper as unwanted sound. Experiments show that prolonged exposure to moderate or intense noise increases the frequency of digestive and circulatory problems; people become more nervous in the presence of noise and may also suffer partial or permanent hearing loss. Noise increases stress, decreases efficiency and seriously distracts people from doing the job at hand. The illustration on the next page demonstrates some stress-provoking consequences of noise.

The OSHA limit for eight hours of exposure is 90 dBA and many believe that exposure at or below ever 85 dBA can cause hearing loss and/or problems. Noise in a typical office with five machines operating exceeds levels recommended for work involving verbal communications. Office tabulating machines have been measured at 80 decibels (dBA) or more, and addressography at 90 dBA. An employee who works continuously on machines such as these in a small room encounters a potentially hazardous noise level. Here are some suggestions to reduce the levels of noise pollution in the office: Place the machines in an enclosed space to limit the number of people exposed to the noise, or use acoustic screens; line the cabinets with sound absorbent material and place felt or other acoustic material under the machines; add structural support to the cabinets to eliminate vibration or use a table with vibration absorbent spring construction; replace flimsy drapery material with more absorbent fabric, add acoustic tile to walls and ceiling; remove shelving and other equipment which reflects noise and may also vibrate.

CONSEQUENCES OF NOISE


N O I S E
Higher Rate of Accidents
Interfers with Speech, Thinking, Distracts from Task, Blocks Communications
Increases Arousal
Hearing Loss or Deafness
Lower Quality Performance

"After sitting near two telecopiers, a MagCard and an electronic typewriter every day, I developed ringing in my ears and subsequently went to two ear specialists who said I have noise-induced hearing loss at the 6000 frequency level." --Executive secretary at a corporate headquarters after seven and a half years on the job.

PART V

"YOUR LIPS TELL ME NO, NO,
BUT THERE'S GREEN LIGHT IN YOUR EYES!"

The Health Effects of V.D.T.'s and C.R.T.'s

Denise and Nora are reservationists working full time on Video Display Terminals (VDT's). They are allowed two 10-minute breaks per day at pre-determined times and have 30 minutes for lunch each day. Both have suffered impaired vision and experience chronic headaches. They make $150 per week.

Loretta has three years of college and a background in accounting. When she was hired by a large insurance company in 1979 she was told that her duties as a switchboard operator were mererly temporary until something more suitable came up in accounting. Last year Loretta developed a heart condition which, after a review of her medical history (excellent), the doctor and Loretta concluded was brought about by the stressful conditions of her job.

Roberta is a bank clerk. She and her husband earn a combined income of $250 per week. A combination of stress and her work in the bank's vault area (the basement) has brought on pleurisy. Some of the sick days which have resulted have cost her her pay and her absentee record just cost her a raise. Other workers in the cold, damp vault area suffer constant colds and one suffers a kidney ailment.

More than three million Video Display Terminals or as some are called Cathode Ray Tubes, are in use in this country; four million more will come on line by 1984. V.D.T.'s are operated the same way as televisions. Electrons are beamed from a cathode or electron gun at an anode, the tube screen where they cause phosphors to emit light to produce images.

The National Institute for Occupational Safety and Health (NIOSH) in its report, "Selected Research Reports on Health Issues ... VDT Operations," has cited some very interesting and serious health concerns for VDT operators. NIOSH research shows that people who use VDT's during the major part of their work day suffer more extensively from boredom, fatigue, the fast pace of work, and physical ailments than those who

work only part of their day on VDT's. The specific health complaints cited included: skin rash, stomach pains, irritated eyes, blurred vision, back pain, stiff neck and shoulders, some loss of feeling in wrists and fingers, changes in color perception, fatigue, nervousness, sore throats, etc.

The health problems of working with VDT's can be caused by poor office layout and lighting and too much time at the machine.

NIOSH recommends some specific steps that can be taken to lessen VDT operator discomforts:

Have proper lighting for both hard copy and the screen. If there is an improper level of illumination, an undue level of visual discomfort will result. The American National Standards Institute recommends illumination levels of 511 lux for VDT work places and 750 lux for general office environments. Excessive light contrasts can create fatigue, due to repeated need for light/dark adaptations. Other recommendations by NIOSH regarding VDT safety include:

1. Insure that the work station is properly designed for the operator. A number of factors can influence worker comfort and health like keyboard height. An operator who needs to reach or stretch in order to do work may develop musculoskeletal fatigue by constantly moving in an abnormal fashion. The keyboard must be at or slightly below the height of the operators elbow. Feet must be touching the floor or used in conjunction with footrests.

2. The VDT should be adjusted for brightness. If a machine is too bright, the operator will experience a jumping of images or a "flicker." Increasing brightness will increase "flickering" and tend to cause eye strain, annoyance and stress.

3. Operators who wear bifocal lenses should have their lower lenses designed for reading distances of about 12 inches. The refitting by a doctor will eliminate neck and back problems that can develop from constantly leaning forward to read copy.

4. Heat from the machine and bad positioning in overcrowded offices can cause stress. Especially to be avoided is the seating of a worker with her back too close to the back of another machine, or the arrangement of workers in clusters facing each other.

5. The size of the screen is of great importance to the viewer's comfort. It is best to have a large screen with a viewing distance of more than two feet and a character height of at least 3/16 of an inch. Research shows that the best color combinations for screens and characters are dark green screens with light green letters and characters.

PART VI

"SMOKE GETS IN YOUR EYES, BUT SO DOES FORMALDEHYDE"
(Arsenic, Cadmium, Hydrogen Cyanide, Sulfide, Lead
and a lot of other stuff)

The Adverse Effects of Smoking On-The-Job

Historically, smoking has been investigated as a cancer producing agent, an asthmatic agent and a host of other maladies caused totally by itself. However, recent research by NIOSH has noted that six different mechanisms interact with smoking to make it lethal much earlier.

First, there are certain chemicals in tobacco products and/or smoke that are found in the workplace, thus the worker gets double and triple doses of the same chemical concentrations (e.g. arsenic, lead, phenol, polycyclic aromatic compounds, cadmium, et al).

Secondly, workplace chemicals may be transformed into more harmful agents by smoking. The heat generated by burning tobacco can transform workplace chemicals into more harmful substances causing such symptoms when inhaled as: fever, chills, muscular aches, weakness, chest discomfort, et al.

Thirdly, tobacco products may serve as vectors by becoming contaminated with toxic agents found in the workplace, thus enhancing entry of the environmental chemical or agent into the body by inhalation, ingestion and/or skin absorption.

Fourthly, smoking may contribute damaging biological effects of chemicals in the workplace in addition to merely being exposed. Chlorine, when combined with smoking, for example, causes more biological damage to the body than just the exposure to chlorine alone.

Fifthly, smoking can combine with the chemicals and fumes in the workplace to form a third element which will deteriorate lungs, among other body parts, at an incredibly faster rate than exposure to the individual chemicals alone.

Finally, smoking contributes to accidents in the workplace. Explosions and fires in places where flammable chemicals are used is not uncommon.

CONCLUSION

Toxic chemicals, noise, inadequate lighting, poor equipment design, smoking and accidents pose serious health hazards for millions of office workers. Stress and boredom also contribute to the problems of safety. Be on guard in the office for hazards. Many are recognizable by using your common sense and a little patience. Recognize that you must take time to relax during the day, that machines must be certified as safe, that the work environment must fit the worker not vice versa, that a great deal of stress can be eliminated by a change in work habits. Take initiatives to become aware of office safety and develop a plan of safety for your office.

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